Program Support for Mission Success

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(Assessments & Support)

Office of the Under Secretary of Defense for Acquisition, Technology and Logistics

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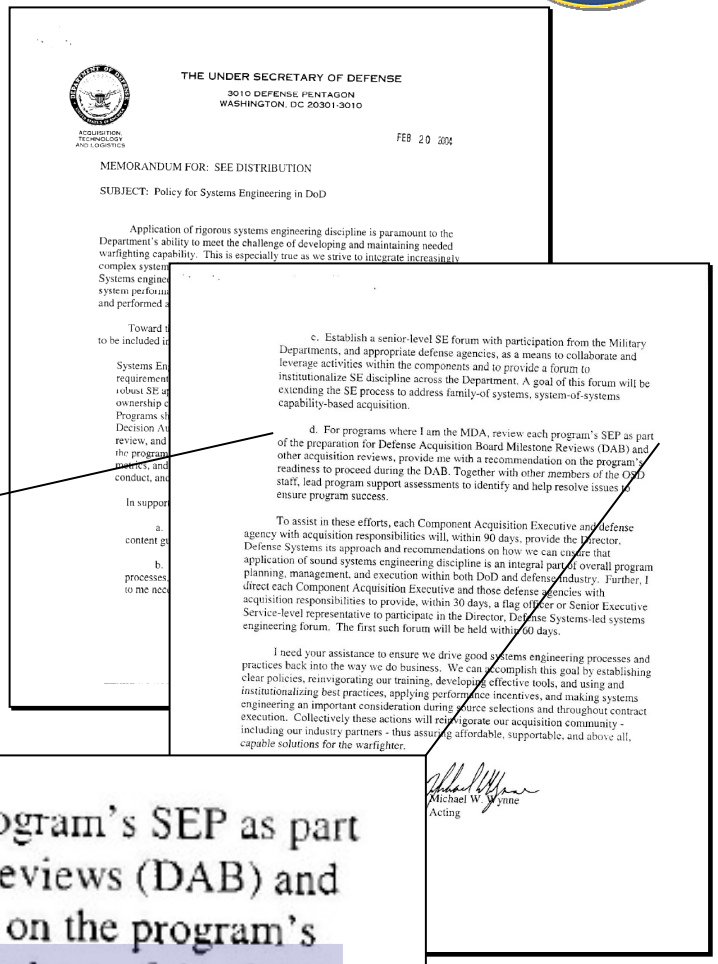
USD(ATL) Imperatives

- "Provide a context within which I can make decisions about individual programs."
- "Achieve credibility and effectiveness in the acquisition and logistics support processes."
- "Help drive good systems engineering practices back into the way we do business."



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MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Policy for Systems Engineering in DoD

Application of rigorous systems engineering discipline is paramount to the Department's ability to meet the challenge of developing and maintaining needed warfighting capability. This is especially true as we strive to integrate increasingly complex system

c. Establish a senior-level SE forum with participation from the Military Departments, and appropriate defense agencies, as a means to collaborate and leverage activities within the components and to provide a forum to institutionalize SE discipline across the Department. A goal of this forum will be extending the SE process to address family-of-systems, system-of-systems capability-based acquisition.

d. For programs where I am the MDA, review each program's SEP as part of the preparation for Defense Acquisition Board Milestone Reviews (DAB) and other acquisition reviews, provide me with a recommendation on the program's readiness to proceed during the DAB. Together with other members of the OSD staff, lead program support assessments to identify and help resolve issues to ensure program success.

To assist in these efforts, each Component Acquisition Executive and defense agency with acquisition responsibilities will, within 90 days, provide the Director, Defense Systems its approach and recommendations on how we can ensure that application of sound systems engineering discipline is an integral part of overall program planning, management, and execution within both DoD and defense industry. Further, I direct each Component Acquisition Executive and those defense agencies with acquisition responsibilities to provide, within 30 days, a flag officer or Senior Executive Service-level representative to participate in the Director, Defense Systems-led systems engineering forum. The first such forum will be held within 60 days.

I need your assistance to ensure we drive good systems engineering processes and practices back into the way we do business. We can accomplish this goal by establishing clear policies, reinvigorating our training, developing effective tools, and using and institutionalizing best practices, applying performance incentives, and making systems engineering an important consideration during source selections and throughout contract execution. Collectively these actions will reinvigorate our acquisition community - including our industry partners - thus assuring affordable, supportable, and above all, capable solutions for the warfighter.

Michael W. Wynne
Acting

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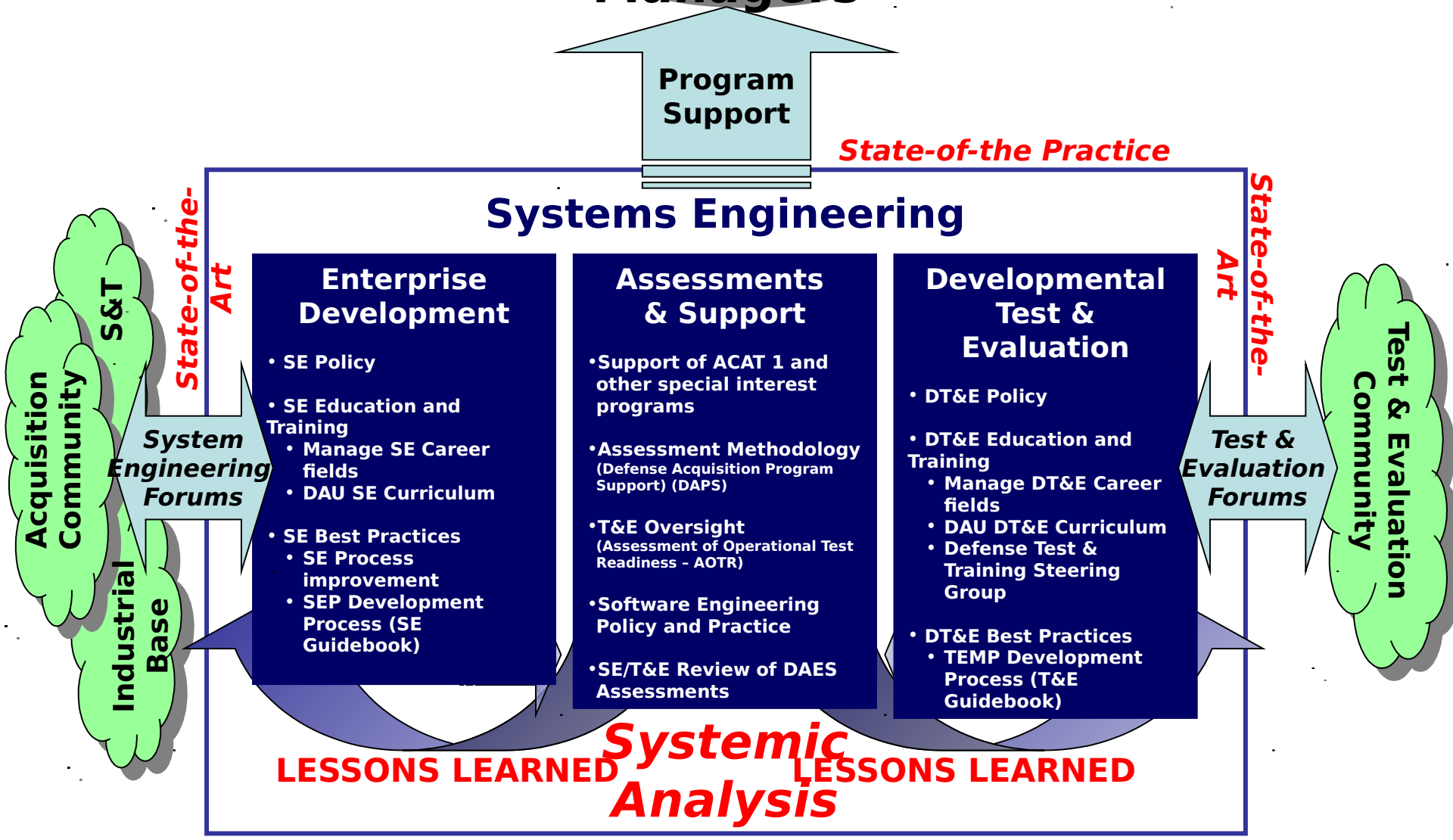
Program Support relating to USD(ATL) Imperatives

Program Support is one of our key enablers to institutionalizing the USD(ATL) imperatives…

- Assist Program Offices and help implement disciplined Systems Engineering practices
- Support and provide oversight of Developmental T&E
- Provide expert advice to help identify and mitigate risks relating to ***cost-schedule-performance*** and achieve program success
- Provide senior leadership with needed information to support the decision making process

Program Executive Offices Program Managers

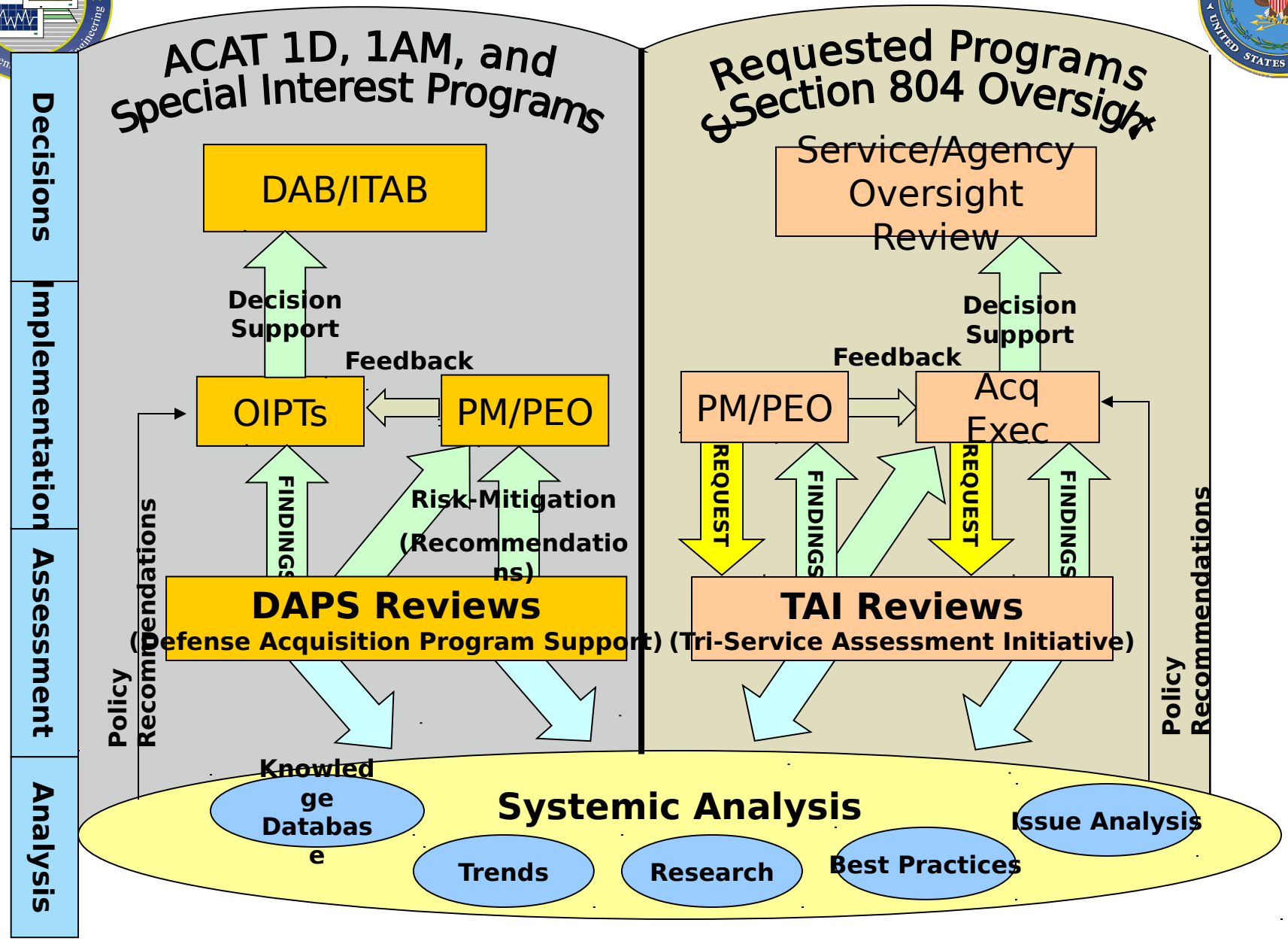


Evolution of SE Program Support

- Early-Mid 1990s: "Blue Book" Reviews
- 1998 - 2003: OSD developed Tri-Service Assessment Initiative (TAI)
  - Provide non-advocate assistance to PMs
  - Fee-for-Service Independent Expert Reviews
  - Initial software focus expanded to full program assessments
  - Successfully conducted 50 + TAI Assessments
- 2003 - 2004: Focus broadened to support OSD oversight reviews and to provide program support
  - Renewed interest in OSD oversight for decision making, re-energizing systems engineering, ensuring program success
  - Developed Defense Acquisition Program Support

Status of Current Program Support Methodologies

- DAPS Methodology built upon TAI assessment typology
  - Focus is primarily on ACAT ID and 1AM programs
  - Key assessment areas retained
    - Requirements, Resources, Management, Process, Product, and Environment
  - Assessment areas modified to emphasize systems engineering
  - More detailed criteria and related questions incorporated as guidelines
  - Scope now addresses pre-milestone decision criteria
- TAI will continue to provide Non-Advocate Reviews for PMs
  - TAI technical management has been transitioned to DCMA
  - Defense Systems will remain the TAI sponsor;


Decisions
Implementation
Assessment
Analysis
ACAT 1D, 1AM, and Special Interest Programs
Requested Programs & Section 804 Oversight
DAB/ITAB
Service/Agency Oversight Review
Decision Support
Feedback
OIPTs
PM/PEO
PM/PEO
Acq Exec
FINDINGS
Risk-Mitigation (Recommendations)
REQUEST
DAPS Reviews
(Defense Acquisition Program Support)
TAI Reviews
(Tri-Service Assessment Initiative)
Policy Recommendations
Knowledge Database
Systemic Analysis
Trends
Research
Best Practices
Issue Analysis

Cornerstone for SE Program Support

DAPS "toolkit" is an enabler for…

- Assessments for DAB/ITAB via IIPT/OIPT process
- Non-Advocate Support Assessments (TAI)
- DAES Assessments
- Assessment of Operational Test Readiness (AOTR)
- SE & T&E support to PMs
- SEP and TEMP preparation and staffing for OSD approval
- U REPEATABLE, TAILORABLE, EXPORTABLE

DAPS v0.9

ASSESSMENT METHODOLOGY FOR PRE-MILESTONE C

1.0 Mission Capabilities/Requirements Assessment Area

2.0

3.0

4.0

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5.0 Verifi

6.0

ASSESSMENT METHODOLOGY FOR PRE-MILESTONE B

1.0 Mission Capabilities/Requirements Assessment Area

2.0

3.0

4.0

5.0

6.0

ASSESSMENT METHODOLOGY FOR PRE-MILESTONE A

1.0 Mission Capabilities/Requirements Assessment Area 4
Sub-Area 1.1 – Operational Requirements 4
2.0 Resources Assessment Area 9
Sub-Area 2.1 – Program Planning and Allocation 9
Sub-Area 2.2 – Personnel 10
Sub-Area 2.3 – Facilities 12
Sub-Area 2.4 – Engineering Tools 13
3.0 Management Assessment Area 16
Sub-Area 3.1 – Acquisition Strategy/Process 16
Sub-Area 3.2 – Project Planning 19
Sub-Area 3.3 – Program and Project Management 21
Sub-Area 3.4 – Contracting and Subcontracting 26
Sub-Area 3.5 – Communication 28
4.0 Technical Process Assessment Area 30
Sub-Area 4.1 – Technology Assessment and Transition 30
Sub-Area 4.2 – Requirements Development 31
Sub-Area 4.3 – Functional Analysis & Allocation 32
Sub-Area 4.4 – Design Synthesis 33
Sub-Area 4.5 – System Integration, Test and Verification 35
Sub-Area 4.6 – Transition to Deployment 37
Sub-Area 4.7 – Process Improvement 38
5.0 Technical Product Assessment Area 38
Sub-Area 5.1 – System Description 38
Sub-Area 5.2 – System Performance 42
Sub-Area 5.3 – System Attributes 43
6.0 Environment Assessment Area 44
Sub-Area 6.1 – Statutory and Regulatory Environment 45

"Focus" Differences Between Milestones A, B, C (slide 1)

Pre-MS A Focus

- Initial Capabilities Documentation (ICD) for capabilities/requirements planning
- Results of system concept studies
- Analysis of Alternatives
- Technology Development Strategy
- Technology Development Planning
- Technology Risk Reduction
- Systems engineering planning

"Focus" Differences Between Milestones A, B, C (slide 2)

Pre-MS B Focus

- Results of Technology Development and Maturation
- Capabilities Development Documentation (CDD) for system requirements definition
- Feasibility and stability of requirements
- Incorporation of MOSA, Net Centric capability, etc.
- Acquisition Strategy
- Test and Evaluation Strategy
- Application of systems engineering process in design, test, and verification
- Design producibility and transition to production planning
- Logistics metrics including supportability,

"Focus" Differences Between Milestones A, B, C (slide 3)

Pre-MS C Focus

- Design Baseline status
- Status of system demonstration, test, and evaluation
- Execution of systems engineering process
- Production metrics and process controls
- Transition to production planning (materials, facilities, personnel, test)
- Operational Test verification
- Logistics metrics verification (including maintenance verification and training)

Assessment Area 1: Operational Capabilities & Requirements

Scope: The operational requirements' clarity, completeness, reasonableness and stability and their implication for the resulting system operational requirements; program constraints, including interdependencies on interoperability requirements.

Area	Sub-Area	Factor
1.0 Operational Capabilities & Requirements	1.1 Operational Requirements	1.1.1 Reasonableness
		1.1.2 Stability
		1.1.3 Dependencies/External Interfaces
		1.1.4 Interoperability/Net-readiness
		1.1.5 Testability

Examples:

- Operational Requirements Document (ORD) not approved prior to RFP.
- Interoperability requirements are expressed in terms of Service-specific doctrine or protocol.

Assessment Area 2: Resources

Scope: Adequacy of assets available to meet the program's objectives, including personnel, facilities, training, etc.

Area	Sub-Area	Factor
2.0 Resources	2.1 Program Planning and Allocation	2.1.1 Sufficiency
		2.1.2 Continuity/Stability
	2.2 Personnel	2.2.1 Qualifications
		2.2.2 Staffing
		2.2.3 Training
	2.3 Facilities	2.3.1 Equipment
		2.3.2 Infrastructure
	2.4 Engineering Tools	2.4.1 System Engineering Tools
		2.4.2 Modeling & Simulation Tools

Examples:

- Inadequate funding for post operational test support.
- Resources diverted to solve another program's problems.

Assessment Area 3: Management (1 of 2)

Area	Sub-Area	Factor
3.0 Management	3.1 Acquisition Strategy/Process	3.1.1 Acceptability
		3.1.2 Feasibility of Acquisition Strategy
	3.2 Project Planning	3.2.1 Schedule Tracking
		3.2.2 Feasibility of Project Planning
		3.2.3 Suitability of Project Planning
	3.3 Program and Project Management	3.3.1 Organization
		3.3.2 Suitability of Staff Experience
		3.3.3 Risk Management
		3.3.4 Techniques and Methods
		3.3.5 Information Systems
		3.3.6 Configuration Management

Assessment Area 3: Management (2 of 2)

Scope: Capability and implementation of planning, resource allocation, and the effective application of tools and techniques to monitor and control the program.

Area	Sub-Area	Factor
3.0 Management	3.4 Contracting and Subcontracting	3.4.1 Conditions/Constraints
		3.4.2 Cost/Schedule Accounting
		3.4.3 Cooperative Agreements
	3.5 Communication	3.5.1 Interfaces
		3.5.2 Teamwork

Examples:

- Lack of overall system acquisition planning.
- Unclear roles/responsibilities among teams, IPTs, etc.

Assessment Area 4: Technical Process

Scope: Identification and utilization of tools and techniques that support a successful development of the program's technical product(s). – **Systems Engineering**

Area	Sub-Area	Factor
4.0 Technical Process	4.1 Technology Assessment and Transition	(none)
	4.2 Requirements Development	(none)
	4.3 Functional Analysis & Allocation	(none)
	4.4 Design Synthesis	(none)
	4.5 System Integration, Test and Verification	(none)
	4.6 Transition to Deployment	(none)
	4.7 Process Improvement	(none)

Assessment Area 5: Technical Product

Scope: Characteristics of the products/services being developed, including HW/SW elements production process capabilities and logistics.

Area	Sub-Area	Factor
5.0 Technical Product	5.1 System Description	5.1.1 Requirements/Specifications
		5.1.2 Architecture
		5.1.3 Technology Maturity
		5.1.4 Government & Supplier-Furnished Products
	5.2 System Performance	5.2.1 Technical Performance
	5.3 System Attributes	5.3.1 Producibility and Production Planning
		5.3.2 Supportability & Maintainability

Examples:

- No system-level architecture planning
- Unreasonable RAM requirements given the use of COTS

Assessment Area 6: Environment

Scope: External influences on the program. Transcends the spectrum from guidance, oversight, and statutory and regulatory, to workplace users, customers, and stakeholders.

Area	Sub-Area	Factor
6.0 Environment	6.1 Statutory and Regulatory Environment	6.1.1 Requirements/Specifications
		6.1.2 Policy

Examples:

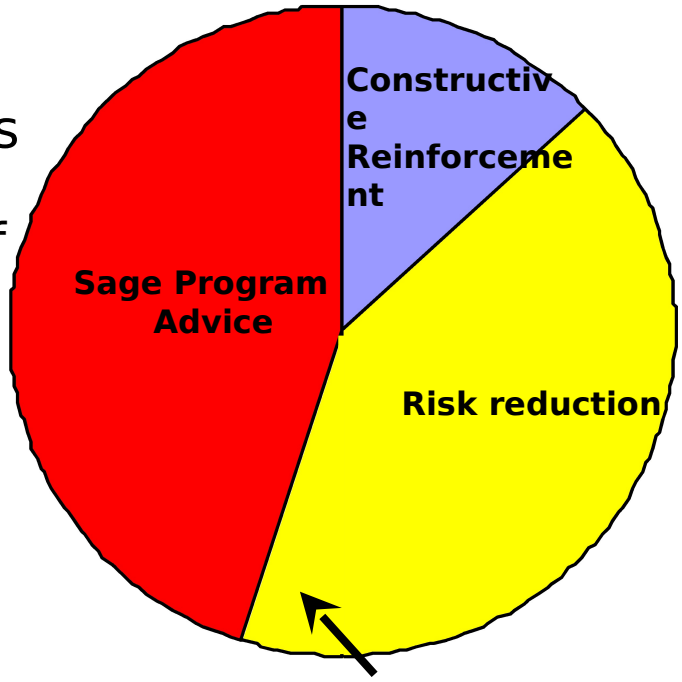
- The dynamics of policy adherence, change, and interpretation are rarely synchronous with program development activities
- Most statutory and regulatory requirements are adequately complied with

Critical Program Performance Issues (Early Systemic Analysis from TAI)

Identified Issues	Relative Occurrence
Process Capability	91 %
Organizational Management	87 %
Requirements Management	87 %
Product Testing	83 %
Program Planning	74 %
Product Quality - Rework	70 %
Systems Engineering	61 %
Process Adherence	52 %
Program Schedule	48 %
Interoperability	43 %
Decision Making	43 %
...	
Configuration Management	26%

Emerging Results from initial DAPS Reviews

- Implementation of over 240 “actionable” recommendations as a result of some recent FY04 reviews is better than 97%, and break out as follows:
  - 13% - Constructive reinforcement of current plans and activities
  - 45% - Sage program advice
  - 42% - Risk reduction actions with cost implications**



- Most Common issues:
  - Schedules driven by external influences
  - Activities not event driven
  - Requirements management (change control, traceability, interoperability requirements)
  - Technical Processes (SE, T&E, Risk Management)

**** Opportunity for Significant Cost Avoidance and High Return on Investment**

Sample Review Recommendations (slide 1)

- Formalize a process to work integration issues across program lines
  - Identify key dependencies within FoS by mission area
  - Work FoS integration issues via MOAs, IPTs, and associate contractor agreements
  - Work FoS Develop an integrated FoS master plan to link FoS activities

- Expand complementary system identification and issue resolution process beyond current PEO Management Process
  - Incorporate an issue resolution process into the current SoS management process
  - Expand the membership to include key programs from architecture development work

- Modify the Acquisition Strategy to demonstrate key functionality by MS C
  - Assess integration on mission system equipped aircraft
  - Adopt quantifiable MS C entrance criteria
  - Update R&M thresholds to support planned total ownership

Sample Program Recommendations (slide 2)

Develop MS C entrance Criteria that demonstrates key mode performance, manufacturing readiness level, and reliability

Entrance Criteria (examples)	Approach (examples)
Reliability The reliability esitmate of the <program> should be on the reliability growth curve with 80% confidence that corresponds to its requirement at the MS C **Maintainability** Demonstrate 80% of the diagnostics effectiveness (fault detection, fault isolation and false alarms) and prognostics requirements **Manufacturing** Demonstrate an Engineering Manufacturing Readiness Level (EMRL) of 4 **Mission Systems** Demonstrate key <program component> funcitonality and SoS interoperability with complementary systems in the SIL and distributed interactive simulation **Etc…**	**Reliability** Mix of component and system level testing to demonstrate performance and analysis of approved modifications **Maintainability** Conduct a Maintenance Engineering Inspection in the SIL or test bed. Demonstrate functionality and insert a minimum of 30 faults on each sub-system **Manufacturing** Materials are fully characterized, in production and readily available. Three-sigma quality for: – Manufacturing processes and procedures – Machines, tooling and inspection/test equipment No machine/tooling investments required **Mission Systems** Evaluate information assurance, spectrum management, etc.

Providing Direct Support to Programs

- 12 program reviews have been conducted in FY04 since inception of the SE policy (Feb 04)
- 8 Non-Advocate Reviews (NARs) completed in FY04
- 17 programs are currently undergoing review (1st Quarter FY05)
- 23 program reviews (to date) are planned for CY05; this number is anticipated to at least double…

Points of Contact

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